

SUGGESTED WEATHER AND UPPER AIR RESEARCH PROGRAMS

Research on the Dynamics of Atmospheric Motions

To develop an improved understanding of the dynamics of all scales of meteorologically significant atmospheric motions, of the forces and processes which govern these motions, and of the interactions among the various scales of motion. In particular, to investigate the characteristics and behavior of meso-scale meteorological circulations, to determine the physical processes responsible for and the mechanisms whereby energy is made available to motions of this scale, and to study the interactions between these motions and those having smaller and larger scales.

Atmospheric Dynamics

To investigate the physical processes which control atmospheric motions and the mechanisms whereby these physical processes act to produce organized circulations. Particularly, to achieve an observational description of organized circulations and of the physical processes associated with them by collecting and interpreting atmospheric observations in accordance with dynamic principles by modern synoptic and statistical techniques, including studies to formulate empirical models of the jet stream under different pressure regimes, of meso-scale vertical motions, and of the irregular terrain effects on the atmospheric motions.

Variability of Meteorological Elements

To determine the climatic temporal and spatial variability of atmospheric parameters and the relationship between this variability and the synoptic data acquired under operational conditions, particularly at high operational levels and in regions where data are sparse.

Ozone Variability

To determine the climatic, spatial, and temporal variability of atmospheric ozone and to relate this variability to routinely-observed atmospheric parameters. Vertical and horizontal variations as a function of synoptic pattern, time of year, and latitude are to be studied.

Geophysics of Interplanetary Matter and Meteor Physics

To determine the role of interplanetary matter upon several operational problems of importance to the Air Force, including: (a) probable hazard of interplanetary matter to high altitude missiles, (b) the ionization structure of the upper atmosphere and its influence on maintaining reliable radio communication, (c) basic physics of the interaction of meteoroids with the atmosphere and solid surfaces as a means of extending velocity

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range of aerodynamics into the hypersonic regime and studying the re-entry problem, and (d) the geophysics of interplanetary particles which may have far reaching importance in determining the role of interplanetary dust on rainfall or the heat balance of the earth.

Contrail Suppression

To acquire a greater knowledge of the basic physics and characteristics of contrail forming processes and environment and to utilize this knowledge to develop methods of avoiding, modifying, or controlling conditions conducive to contrail formation.

Cloud Physics Research

To understand the physical, electrical, chemical, and optical properties of clouds.

Atmospheric Optics

To determine how, when where an object at any place, under any circumstances could be seen (detection and recognition by the human eye or by optical, electro-optical, or photographic means that respond to e-m radiation in the visible and near visible wavelengths). The proximate goal is to determine and employ the techniques for seeing an object within the extent of the earth's atmosphere, then to extrapolate or interpolate the results in terms of other atmospheres and in space.

Meteorological Applications of Satellite Data

To determine how a satellite vehicle can best be employed to make weather observations, and to develop necessary sensing instrumentation and auxiliary equipment by using aircraft to simulate satellite observation, and to test equipment designed for satellite.

Geophysical Surveillance

To exploit infrared techniques to observe satellites and to study feasibility of employing other surveillance techniques.

Research on Infrared Spectroscopic Techniques

To improve infrared physics and infrared molecular spectroscopy with ultimate aim to improve development of military infrared devices and interpretation of military infrared target and background data. Specifically, attempts will be made to adapt infrared spectrometric apparatus for airborne conditions.

Ionospheric Characteristics

To extend existing knowledge of the ionized regions from the lower D-layer up to the highest levels of ionization.